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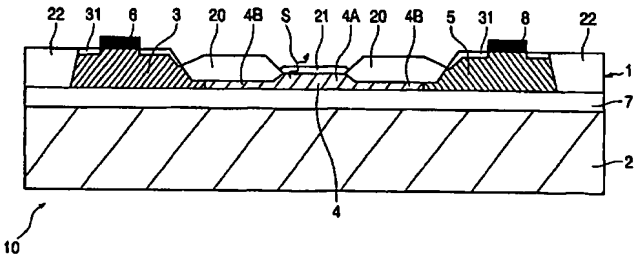
(54) Title: RADIATION-EMITTING SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING SUCH A DEVICE



(57) Abstract: Radiation-emitting semiconductor device and method of manufacturing such a device. The invention relates to a radiation-emitting semiconductor device (10) comprising a silicon-containing semiconductor body (1) and a substrate (2), which semiconductor body (1) comprises a lateral semiconductor diode positioned on an insulating layer (7) which separates the diode from the substrate (2). The lateral semiconductor diode comprises a first semiconductor region (3) of a first conductivity type and with a first doping concentration, a second semiconductor region (4) of the first or a second conductivity type opposite to the first conductivity type and with a second doping concentration which is lower than the first doping concentration, and a third semiconductor region (5) of the second conductivity type and with a third doping concentration which is higher than the second doping concentration, the first and the third region (3, 5) each being provided with a connection region (6, 8), and, during operation, radiation (S) being generated in the second region (4) due to recombination of charge carriers injected therein from the first and the third region (3, 5). According to the invention, the second semiconductor region (4) comprises a central part (4A) which is surrounded by a further part (4B) the bandgap of which is larger than the bandgap of the central part (4A). In this way, the radiation yield is increased in an indirect semiconductor material such as silicon in the central part (4A) as translation of the relatively long-living charge carriers towards a non-radiative recombination center is limited because of the barriers in the valence and conduction band in the further part (4B). Preferably, the bandgap in the further part (4B) is made larger in that the thickness of said part (4B) is so small that quantum size effects occur therein, while the central part (4A) has a thickness which is so large that such effects do not occur or substantially do not occur.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01L H01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 370 830 A2 (DIRECTOR-GENERAL OF THE AGENCY OF INDUSTRIAL SCIENCE AND TECHNOLOGY; M) 30 May 1990 (1990-05-30) figure 1	1
A	US 5 438 210 A (WORLEY ET AL) 1 August 1995 (1995-08-01) cited in the application the whole document	
A	STABILE P J ET AL: "LATERAL IMPATT DIODES" IEEE ELECTRON DEVICE LETTERS, IEEE INC. NEW YORK, US, vol. 10, no. 6, 1 June 1989 (1989-06-01), pages 249-251, XP000034493 ISSN: 0741-3106 the whole document	

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☒ Patent family members are listed in annex.

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Name and mailing address of the ISA	Authorized officer
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0370830 A2	30-05-1990	JP 2144983 A	04-06-1990
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